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Adolescent change Language within a Brief Motivational Intervention and Substance Use Outcomes

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Abstract

The notion that client language about change is related to actual behavioral change is central to the practice of motivational interviewing (MI), but has not been examined in adolescent clients. In this study homeless adolescents who used alcohol or illicit substances but were not seeking treatment ($n = 54$) were recorded during brief motivational interventions. Adolescent language during sessions was coded based on MI concepts, and ratings were tested as predictors of rates of substance use over time. Types of adolescent speech included global ratings of engagement and affect, as well as counts of commitment to change, statements about reasons for change, and statements about desire or ability to change. Results of multivariate linear regression indicate that statements about desire or ability against change, although infrequent ($M = 0.61$ per 5 minutes), were strongly and negatively predictive of changes in substance use rates (days of abstinence over the prior month) at both 1- and 3-months post baseline assessment ($p < .001$). In contrast, statements about reasons for change were associated with greater reductions in days substance use at 1-month assessment ($p < .05$). Commitment language was not associated with outcomes. Results suggest that specific aspects of adolescent speech in brief interventions may be important in the prediction of change in substance use. Future studies are needed to test the observed relationships in larger samples and other clinical contexts, and assess if youth language about change mediates effects of clinical interventions.

Motivational interviewing (MI; Miller & Rollnick, 2002) is a popular, empirically-based counseling method for a range of health-related problems. Defined as a “client-centered, directive method for facilitating intrinsic motivation to change by exploring and resolving ambivalence,” (Rollnick & Miller, 1995), MI emphasizes formation of collaborative therapeutic relationships with clients through which client language about change may be strategically elicited and reinforced. “Change language” is defined as client expressions of problems with the current state, benefits of change, and hope and optimism about future change (Miller & Rollnick, 2002). In articulating a theory for MI, Miller and colleagues have stated that “1) The practice of MI should elicit increased levels of change and decreased levels of resistance from clients, 2) The extent to which clients verbalize arguments against change (resistance) during MI will be inversely related to the degree of subsequent behavior change, and 3) The extent to which clients verbalize change talk (arguments for change) during MI will be directly related to the degree of subsequent behavior change” Hettema, Steele, & Miller, 2005, p. 106).

MI should be considered among therapeutic approaches based in the “ordinary language” of clients, in that therapeutic discourse is understood based on common interpretations of what clients say about thoughts, feelings and behavior (Moyers et al., 2007). The empirical relationship between client language and outcomes thus assumes a central role in the suggested impact of MI; yet, evidence for this hypothesized relationship is limited. With respect to verbalizations contrary to change, Miller, Benefield, & Tonigan (1993) reported that independent ratings of client interrupting, arguing, off-task responses, and other negative responses within a brief intervention about alcohol use were strongly predictive of poorer one year drinking outcomes. Recently, Moyers, Martin, Christopher et al. (2007) coded client language of participants randomly selected from each of three Project MATCH therapy conditions. Rates of both positive and counter-change language in the first clinical session across treatments predicted follow-up drinking outcomes.

Further evidence of a link between positive client change language and clinical outcomes in MI sessions was reported by Amrhein and colleagues (2003) using sessions with illicit drug users as they presented for treatment. Client language was subjected to a linguistic analysis that subdivided change language into elements thought to vary with respect to the nature and degree of commitment to change (commitment, desire, ability, need, readiness, and reasons). Clients who reduced their substance use during and after treatment made more frequent commitment to change statements during the evaluation of a change plan at the end of the interview compared to those who intermittently used substances over time or who never improved. Other aspects of change language were predictive of commitment language.

This small, emerging evidence-base provides some support for the notion that client change language can prospectively predict clinical outcomes. These studies, however, have been completed with adults who were seeking treatment (or a free check-up; Miller et al., 1993). Yet MI has been adopted in numerous clinical and non-clinical contexts (Miller & Rollnick, 2002). One common focus for brief interventions in opportunistic contexts is with young people, who seldom seek services based on their own concerns for health and safety (Baer & Peterson, 2002; Monti, Colby, & O'Leary, 2001). Despite this interest, we are unaware of studies that describe the target of MI sessions, youth verbalizations about behavior change, or examine whether these relate to current or future behavior. Such information would seem important given that aspects of adult language are still developing in adolescents (Nippold, 2000; O'Kearney & Dadds, 2005). Hence, adolescents receiving feedback about drug use risks may talk about change very differently than adults seeking treatment.

The current analyses sought to extend prior studies of client language within MI sessions by examining the language of homeless youth who use alcohol and illicit substances and were recruited for a risk reduction program (Baer et al., 2007) that utilized a brief motivational intervention (BMI). We tested if global ratings of client behavior in MI sessions, and behavioral ratings of positive and counter-change language and commitment talk, would predict changes in substance use from baseline to one and 3 month follow-ups.

Method

Design and Procedures

All procedures were approved by the University of Washington IRB. A sample of youth (ages 13-19) was recruited from a non-profit, faith-based drop-in center (Baer et al., 2007) by study counselors. Inclusion criteria included: 1) lack of stable housing, and 2) report of substance use in the prior 30 days. The 127 youth were randomly assigned to receive four sessions of a brief motivational intervention (BMI, $n = 75$) or drop-in center treatment-as-usual (TAU, $n = 52$), which included no specific clinical intervention, although case management and other services were available. Only youth receiving BMI are included in current analyses. As MI

was not found to be superior to TAU in this study (see Baer et al., 2007), and TAU received no specific treatment sessions, mediating tests of the function of client change for MI were not possible. Follow-up assessments were conducted via appointments and intercept at the drop in center and on the streets both one and three months post-baseline. Following baseline interviews, youth assigned to BMI stayed for the 1st of four BMI sessions, with latter BMI sessions scheduled in the following four weeks. Baseline interviews were conducted by a masters-level clinician with follow-up interviews conducted by alternative project staff. As described elsewhere (Baer et al., 2007), participants received cash for completing study assessments, and vouchers redeemable at local retail stores for completed BMI sessions. With consent of participants, baseline interviews and BMI sessions were audio-taped.

Sample Description and Retention—In the original study attrition was not associated with experimental condition, baseline demographic, or substance use rates. Participants identifying themselves as minority racial group members were retained at slightly higher rates compared to those self-identified as nonminority. Of 75 youth assigned to BMI, 21 were removed from analyses due to extensive missing data or concerns about validity of reported substance use. These include youth who: 1) were incarcerated in the 30 days prior to baseline assessment ($n = 3$) or a follow-up assessment ($n = 4$), 2) received strongly negative interviewer ratings regarding consistency of their responses ($n = 2$), 3) refused to be audio-taped ($n = 6$) or where taping malfunction eliminated at least half of the session ($n = 4$), 4) attended only highly abbreviated sessions ($n = 1$), or 5) missed both follow-up assessments ($n = 1$). No differences were seen between those included vs. excluded in relation to gender, age, or being a racial/ethnic minority (all ns). At baseline the 21 excluded by these criteria reported less substance use in the previous 30 days than the 54 included (days abstinent $M = 14.0$, $SD = 8.8$ vs. $M = 7.5$, $SD = 8.9$; $t = 2.84$, $df = 73$, $p < .01$).

The resulting youth sample for current analysis showed a fairly even gender distribution (54% male) and mean age of 17.9 years ($SD = 1.3$). Reported ethnicity was 59% Caucasian, 17% Multi-Racial, 7% Native American, 7% African American, 6% Hispanic/Latino, and 4% Asian/Pacific Islander. The sample reported high rates of substance use, with a mean of 7.5 ($SD = 8.9$) days of abstinence from substances in the month prior to baseline assessment. Alcohol use in the past month was reported by 89.1% of the sample. Marijuana was the most commonly used drug in the past 30 days by youth report (94.4%), followed by “club drugs” (57.1%), methamphetamine (53.5%), hallucinogens (35.9%), cocaine (33.3%), and opiates other than heroin (33.3%).

Intervention Description—The BMI followed the model of an extended substance use “check-up” where information/exercises about patterns and risks of substance use are provided as personal feedback (Miller, Sovereign, & Krege, 1988). Intervention content is described elsewhere (Baer et al., 2007). Interventionists were trained in motivational interviewing techniques then supervised via regular session audio-tape review by the first author (a licensed psychologist, member of the Motivational Interviewing Network of Trainers – MINT, and an experienced MI trainer). Interventionists were trained to be non-confrontational in tone, and provide advice about risk reduction only with permission. Initial sessions averaged 17 minutes ($SD = 7$), with subsequent sessions averaging 33 minutes ($SD = 11$). Of the 54 youth assigned to BMI, 27 attended all four sessions, 9 attended three, 9 attended two, and 9 attended one. Mean intervention time across sessions was 79.8 minutes ($SD = 42.9$). Youth ratings of the intervention were overwhelmingly positive (Baer et al., 2007).

Measures

Substance Use Frequency/Severity—Participants were asked to recall substance use in the prior 30 days using a modified Time Line Follow-Back interview (Sobell & Sobell,

1993). Given that individuals used many combinations of substances over the 30 day period, an omnibus measure of “days of abstinence” from alcohol, marijuana, and other drug use (excluding tobacco) was calculated. We used abstinence days for conceptual clarity - days of use may represent days of use of any number of substances, whereas abstinence is clearly defined by no substance use.

Validation of Drug Use Self-Report—Urinalysis (UA) was used to calculate sensitivity and specificity of self-reported cocaine, amphetamine, opiate, and marijuana use at the three-month follow-up. With 41 of 54 (%) of youth providing UA, no evidence of systematic underreporting was observed (Baer et al., 2007).

Indices of Intervention Discourse—Audiotaped BMI sessions were coded by three trained raters. The scoring system utilized components of the Motivational Interviewing Skills Code (MISC 1.0; Miller, 2000; Moyers, Martin, Catley, Harris, & Ahluwalia, 2003), and psycholinguistic framework of Amrhein and colleagues (2003) to characterize adolescent language in BMI sessions. Based on the MISC 1.0, the scoring system included three global ratings of client qualities on 7-point Likert scales (1=not at all, 7=strong): 1) *affect*, how openly and directly emotions were expressed, 2) *cooperation*, how much responsibility for completing in-session tasks was shared, 3) *disclosure*, how much personal information was revealed. An additional global score 4) *task-orientation*, was added to reflect how much the adolescent remained focused and engaged during therapeutic tasks.

Following Amrhein et al, (2003) frequency of youth statements about change, termed “change talk” (Miller & Rollnick, 2002), were tallied relative to substance-related risk reduction, promotion of health/safety, or service utilization. Three categories were coded to reflect differing types of language and degree of interest in change noted in prior research (Amrhein et al, 2003) and based on qualities of adolescent language observed in this and previous studies. These included: 1) *commitment*, or statements of explicit intention to change (or maintain) behavior (e.g. “I’m not going to use meth again” or “I’m never going to stop smoking pot”), 2) *reasons*, or statements providing a rationale for (or against) behavior change (e.g. “When I’m high I fight with my girlfriend” or “Using drugs helps me cope with being on the street”)¹, and 3) *desire/ability*, or statements that indicate desire, willingness, or ability/self-efficacy to change or to not change (e.g. “I’d like to cut back my drinking” or “I can’t deal with not using because I know it’ll be too painful”). Irrespective of categorization, each instance of change talk was also assigned a positive/negative valence reflecting if the statement was in favor or opposed to reduced substance use, reduced health risks, or increased service utilization. Coders recorded tallies of each type of change talk across five minute intervals within each session. In order to control for varying degrees of talkativeness, session lengths, and attendance, tallies were converted to average rates of change talk per five minutes. Overall rates of each type of change talk were calculated across individual sessions, or across all sessions attended, as the total tally across 5 minute intervals divided by number of 5 minute intervals.

Training and Reliability of Raters

Three raters received extensive training in recognizing and rating MI elements in therapeutic dialogue and attended weekly supervision meetings where scoring dilemmas were discussed. Inter-rater reliability was assessed from a subset of sessions that all three rated ($n = 15$, 8.3%). ICCs, computed as a two-way random model, were acceptable based on Cicchetti (1994) criteria (above .40), although lowest for commitment language (Table 1).²

¹In order to assess beliefs about risks and harms associated with substance use, codes for Reasons For and Reasons Against change included statements referring to other people in addition to self. Analyses were completed with and without such codes without appreciable differences in results.

Results

Descriptives for session codes are shown in Table 1. For the 7-point scale, mean global scores for Cooperation, Affect, and Task Orientation were between 4 and 5, whereas youth Disclosure was just above 5. Youth more often expressed reasons for, reasons against, and desire/ability for change; and less often expressed desire/ability against, commitment for, and commitment against change.

Intercorrelations between global scores, change language, and substance use rates at baseline and follow-up assessments are presented in Table 2. As can be seen, desire/ability comments against change were significantly correlated with substance use rates at follow-up assessments. There also are several modest correlations among global ratings and among rates of use of different forms of change language. Among desire/ability and commitment, respectively, statements for and against change were correlated. This may reflect greater talkativeness or suggest that youth may tend to use one form of change language to express both positive and negative motivation. Partial correlations (controlling for the sum of other talk types) suggest the former may be true for desire/ability for and against change ($r = .35$, $p < .05$ vs. partial $r = .23$, ns) and the latter true for commitment for and against change ($r = .40$, $p < .01$ vs. partial $r = .39$, $p < .01$).

Multiple regression assessed whether session language predicted changes in substance use rates. For each follow-up point, multiple regression predicting substance use abstinence in the prior 30 days was performed in Mplus 5.0 using robust maximum likelihood estimation (MLR), for sets of predictors. Three participants were missing assessment at 1-month, and 4 at 3-month (all 54 had data for at least one follow-up). To assess prediction of change in substance use rates, and control for treatment exposure, regressions included baseline prior 30 day abstinence and the number of feedback sessions attended. Demographic characteristics (gender, race, age) were unrelated to either predictors or outcomes in preliminary analyses, and were excluded in regressions to preserve statistical power in this small sample. Counselors were not associated with substance use outcomes in the original study, so also were excluded in regression analyses. As noted in our prior report (Baer et al., 2007), days of abstinence increased over time for those receiving BMI (not differing from those in the control group). For youth included in current analyses, average days of abstinence over the prior 30 was 7.5 ($SD = 8.9$) at baseline, then increased to 11.5 ($SD = 10.8$) at 1-month follow-up and 11.0 ($SD = 10.6$) at 3-month follow-up.

Tests of the four youth global scores on change in days of abstinence showed that higher Task Orientation predicted more days of abstinence at the three month, but not one month, follow-up (standardized beta = .44, $p < .01$). No other effects were statistically significant.

In regressions predicting one-month abstinence rates from youth verbalizations about change, two of the six youth talk rates had statistically significant effects. Reasons in favor of change predicted greater abstinence and desire/ability against change predicted less abstinence (standardized $\beta = .23$ and $-.57$, respectively, $p < .05$ and $.001$). Only desire/ability against change predicted less abstinence at the three-month time-point (standardized $\beta = -.41$, $p < .05$). Figure 1 illustrates the magnitude of effect based on desire/ability against change. Those who expressed more than the median desire/ability against change reported mean abstinence days at the one- and three-month follow-ups of 6.9 and 8.7 ($SD = 9.1$ and 10.0 , respectively) while those making less than the median amount reported mean abstinence of 16.2 and 13.4 days ($SD = 10.5$ and 11.0 , respectively).

²Despite lower coding reliability, scores for commitment language were included in initial predictive analyses. Study results did not differ with subsequent exclusion of commitment language from analyses.

Supplemental analyses addressed possible alternative interpretations of results from regression analyses. Outlier analyses (Cohen, Cohen, West, & Aiken, 2003) in which Cook's distance and leverage scores were computed, and outliers removed, showed no substantive changes in these findings. Regressions for 1- and 3-month outcomes including significant predictors from the two original regression analyses (global ratings and rates of change language) suggested that the effect of Task Orientation on 3-month abstinence did not persist once change language was included. Additional analyses revealed no predictive effects of youth talk in the first BMI session, of changes in rates of language across sessions, or differential effects of change talk rated in the first half vs. second half of sessions.

Finally, we explored why reasons for change had a non-significant zero-order correlation with one-month days abstinent ($r = -.03$, see Table 2), but was a significant predictor in multivariate regressions (including those controlling for outlier effects). Review of partial correlations with other variables in the regression model suggested statistical suppression only in relation to desire/ability against change (partial $r = .27$, $p = .065$). Analysis of the relation between these two variables in prediction of change in substance use rates, based on median split of each, suggested an interaction (2×2 ANOVA, Interaction $F = 3.10$, $df = 1, 3$, $p = .09$). When desire/ability against change was high, there was a detrimental effect on change in abstinence regardless of whether reasons for change was low or high (mean abstinence change = 1.0 and 0.5, for those with low and high reasons for change, respectively, sd 's = 5.5 and 7.9), however, when desire/ability against change was low, reasons for change appears to affect abstinence (mean abstinence change = 2.9 and 11.7, for those with low and high reasons for change, respectively, sd 's = 11.2 and 10.3).

Discussion

Our examination of youth verbalizations during BMI sessions provides support for one of the basic tenets of MI – that client change language is related to subsequent behavior change. Despite a myriad psychological and social problems among homeless youth, their general disengagement from broader social systems, and that this sample was not seeking treatment, change language in BMI sessions regarding substance use or service utilization significantly and prospectively predicted changes in substance use. Analyses suggest that two different aspects of youth language about change are differentially indicative of actual behavioral change: statements about reasons in favor of change, and statements counter to the desire or ability to change.

The strongest effect was noted for desire/ability language against change. Such comments were strongly and prospectively associated with substance use reductions at both follow-ups, despite being fairly uncommon (mean frequency of .61 per 5 minutes). Thus, data suggest that within BMI sessions with adolescents, a few comments about not wanting, needing, or being able to change bode poorly for subsequent reduction in substance use. Such utterances may be a marker of a specific type of resistance in MI sessions; resistance has been associated with poor clinical outcomes among adolescents (Karver et al., 2006; Shirk & Karver, 2003). This finding is also consistent with literature on behavioral intentions (Fishbein & Ajzen, 1975; Fishbein, Hennessy, Yzer, & Douglas, 2003; Webb, Baer, Getz, & McKelvey, 1996), despite these observational codes differing from typical measures of attitudes and behavioral intention.

Stated reasons for change also reveal a significant prospective relation with outcomes, albeit smaller than that noted for comments about desire/ability against change, and possibly relevant only when statements of desire/ability against change are absent. Prior research (Baer, Peterson, & Wells, 2004) suggests that most homeless youth describe themselves as precontemplative or contemplative about change. We expected that, at best, homeless youth would express ambivalence about change in substance use. Given the brief intervention process

where feedback is provided about risks and counselors strategically work to elicit positive reasons for change, we expected that problem recognition expressed through reasons for change might emerge. Compared to other forms of change language, positive reasons for change were the most common form of verbalization (1.32 per 5 minute interval). Still, this rate does not suggest that these BMI sessions were filled with discussions about negative aspects of substance use and benefits of reduction and cessation. A relatively few stated reasons for change may be important for future behavior nonetheless, especially if youth are not otherwise negative with respect to their desire or ability to change. Our data do not suggest that the rate of such language changed across or within sessions.

Commitment language, which Amrhein et al. (2003) have argued as most important in the prediction of substance use outcomes, was not found to be associated with change in this study. The Amrhein study differed from this one in that it took place among adults who were seeking treatment for drug problems, and the brief MI intervention included a discussion of a change plan at the end. In contrast, our protocol with homeless youth varied from 1 to 4 sessions and followed a booklet from which adolescents could choose topics for discussion. In this context, commitment language was rare (0.27 per 5 minutes in favor of change, 0.18 per 5 minutes against change), perhaps accurately reflecting the fact that youth were not seeking assistance. Yet an intervention that includes exercises that elicit commitment language (such as developing a change plan) might produce positive findings about commitment language. Additionally, commitment language among these youth proved difficult to code, ICCs were lowest for this category; a different rating method for this language category might lead to different results.

It is important to acknowledge that this study tests the relationship between youth verbalizations and subsequent behavior only, and does not test a complete causal chain for MI efficacy. Several additional features of the study should cause readers to draw conclusions cautiously. We would be more confident in these relationships if we had a larger sample and more variability in youth substance use. Despite a careful approach to data analysis (including evaluating the influence of few cases or outliers), the inherent over-fitting of regression models requires that the relationships we have reported be replicated. The study is also limited by the use of self-reported substance use (although urine testing suggests reports were not systematically biased). Results are based on those youth who were not recently incarcerated and who allowed audio-taping. Generalization to other adolescent populations, both housed and homeless, requires study. Results also relied on a specific coding scheme which was informed by prior studies yet altered by investigators for this study. Alternative coding schemes, which either combine or split constructs differently, may suggest different patterns and predictive relationships. Although we analyzed only those codes that reached a minimum level of confidence based on Cicchetti's (1994) standards, higher and more consistent inter-rater reliability would enhance confidence in the observed relationships.

While not providing a direct mediating test, the relationships reported here should provide support for those who design brief interventions where counselors are taught to pay careful attention to and elicit change language from adolescent clients. Youth verbalizations about change may provide one method of assessment for likelihood of change, which could lead to tailored interventions. For the clinician, taping, transcribing and reliably coding verbalizations are potentially unfeasible. If these results are replicated, attention to more parsimonious means of assessing change talk will allow for clinical application.

Our data suggest that negative comments about desire or ability against change, even when observed infrequently, are relatively strongly predictive of poor outcomes. Additionally, even among youth with multiple social and psychological difficulties, positive statements about reasons for change may indicate that risk reduction is likely. Whether and how the process of language development itself moderates this relationship would be a fruitful area for

exploration. In addition, it is left for future research to establish that the specific eliciting and reinforcing of such change language (for example, through motivational interviewing) can in fact alter the course of substance use and other risk behavior among high risk youth.

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Figure 1.
Days of abstinence depending on desire/ability against change talk (individuals above vs. below the median)

Table 1
Coding reliability, means and standard deviation for youth and counselor language, averaged across sessions.

	ICC*	Mean	SD	Range	
				Min	Max
<u>Global Scores (range 1 to 7)</u>					
Affect	.57	4.44	0.80	2.25	6.00
Cooperation	.62	4.86	0.94	2.75	7.00
Disclosure	.54	5.10	0.96	2.00	7.00
Task orientation	.47	4.47	0.92	2.50	6.25
<u>Talk (rate per 5 minutes)</u>					
Reasons for	.67	1.32	0.69	0.00	3.32
Reasons against	.64	1.01	0.78	0.00	3.67
Desire/ability change language for	.64	1.17	1.05	0.00	6.75
Desire/ability change language against	.54	0.61	0.41	0.00	1.71
Commitment for	.43	0.27	0.27	0.00	1.77
Commitment against	.42	0.18	0.19	0.00	0.73

* Intraclass correlations (ICCs) are calculated for 3 coders across 15 sessions

Table 2
Intercorrelations among Language Codes, Global Ratings, and Substance Use Rates (n = 50-54).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Reasons For Change	--	.14	.36	.42	.36	.07	.08	.19	.06	.11	-.05	-.03	.06
2. Reasons Against Change		--	.19	.42	-.20	.28	.13	-.05	.29	.07	-.13	-.19	-.09
3. Desire/Ability For Change			--	.35	.10	-.17	.29	.31	.21	.20	.07	-.13	-.08
4. Desire/Ability Against Change				--	-.01	.41	.17	.09	.11	.00	-.17	-.50	-.35
5. Commitment For Change					--	.40	--	.03	-.01	-.12	.20	.24	.11
6. Commitment Against Change						--	.07	-.14	.03	-.10	.06	-.06	-.12
7. Global Affect							--	.56	.74	.42	.08	.06	-.12
8. Global Cooperation								--	.60	.72	.32	.22	.18
9. Global Disclosure									--	.44	.22	.12	-.07
10. Global task Orientation										--	.17	.18	.29
11. Days Abstinent (baseline)											--	.52	.35
12. Days Abstinent (1-month)												--	.63
13. Days Abstinent (3-month)													--

Bolded coefficients are statistically significant; those less than or equal to .35, p < .05; those above .35, < .01.

Days Abstinent refers to days in the past 30 of abstinence from use of psychoactive substances (alcohol, marijuana, and other drug use, excluding tobacco).